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उर्वरक — विशिष्टि
(पहला पुनरीक्षण)

**Nitrophosphate Based Granulated
Fertilizers — Specification**
(*First Revision*)

ICS 65.080

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Soil Quality and Fertilizers Sectional Committee had been approved by the Food and Agriculture Division Council.

This standard was first published in 1971 and covered three grades of Nitrophosphate based granulated fertilizers namely, 20-20-0, 15-15-15 and 18-18-9.

The present revision is taken up to align the requirements of Nitrophosphate based granulated fertilizers with those specified in *Fertilizer (Control) Order*, 1985.

The following major changes have been effected in this revision:

- a) All 8 grades of nitrophosphate based granular fertilizers which are listed in *Fertilizer (Control) Order*, 1985 have been included.
- b) Grade 18-18-9 has been deleted.
- c) Grade 15-15-15 has further been classified in two grades based on type of nitrogen content, quantity of water soluble phosphates and sulphur content.
- d) Requirement for free acidity has been removed.

For particle size, the use of test sieves conforming to IS 460 is prescribed. Where IS Sieves are not available, other standard sieves as judged from aperture size may be used.

In the formulation of this standard, due consideration has been given to the provisions of the *Fertilizer (Control) Order*, 1985, the *Essential Commodities Act*, 1955 and the *Legal Metrology (Packaged Commodities) Rules*, 2011. However this standard is subject to the provisions imposed under this Order, wherever applicable.

For purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***NITROPHOSPHATE BASED GRANULATED
FERTILIZERS — SPECIFICATION***(First Revision)***1 SCOPE**

1.1 This standard prescribes the requirements and the methods of sampling and test for nitro phosphate based granulated fertilizers.

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

<i>IS No.</i>	<i>Title</i>
460	Test sieves.
(Part 1) : 2020	Wire cloth test sieves (<i>fourth revision</i>)
(Part 2) : 2021	Perforated plate test sieves (<i>fourth revision</i>)
(Part 3) : 2021	Methods of examination of apertures of test sieves (<i>fourth revision</i>)
1070 : 1992	Reagent grade water (<i>third revision</i>)
5985 : 1985	Code of practices for handling and storage of bagged fertilizers (<i>first revision</i>)
6092	Method of sampling and test for fertilizers:
(Part 1) : 1985	Sampling (<i>first revision</i>)
(Part 2) : 1985	Determination of nitrogen (<i>first revision</i>)
(Part 3) : 1985	Determination of phosphorus (<i>first revision</i>)
(Part 4) : 1985	Determination of potassium (<i>first revision</i>)
(Part 5) : 1985	Determination of secondary elements and micronutrients (<i>first revision</i>)
(Part 6) : 1985	Determination of moisture and impurities (<i>first revision</i>)

*IS No.**Title*

7406 (Part 1) : 1984	Specification for jute bags for packing fertilizers: Part 1 Laminated bags manufactured from 407g/m ² : 85 × 39 Tarpaulin fabric
9755 : 2016	High Density Polyethylene (HDPE)/Polypropylene (PP) woven sacks for packing fertilizers — Specification (<i>fifth revision</i>)

3 GRADES**3.1 Nitrophosphate**

There shall be three grades of nitrophosphate based granulated fertilizers, depending on the content(s) of nitrogen, phosphorus and potassium (N-P-K), namely:

- (20-20-0) Grade,
- (23-23-0) Grade, and
- (24-24-0) Grade

3.2 Nitrophosphate with Potash

There shall be following grades of nitrophosphate (with potash) based granulated fertilizers, depending on the content(s) of nitrogen, phosphorus and potassium (N-P-K), namely:

- (14-14-21) Grade,
- (15-15-15) Grade,
- (15-15-15) Grade II,
- (15-9-20) Grade, and
- (21-6-13) Grade

4 REQUIREMENTS**4.1 Particle Size**

When tested by the method given in IS 460 (Parts 1, 2 and 3), not less than 90 percent of the material shall pass through 4 mm IS sieve and be retained on 1 mm IS sieve. Not more than 5 percent shall be below 1 mm IS sieve. A tolerance of 3 units of particle size shall be permissible.

4.2 Shape of Granules

It is recommended that the granules shall be spherical, smooth and shall be free flowing through a fertilizer drill.

4.3 Resistance to Breakdown of Granules

A single granule of the material, taken from the size range 2.00 mm and 2.36 mm, shall resist a load of 1.0 kg, *Min*, when tested as prescribed in Annex A.

4.4 Lump Formation

The material shall pass the test prescribed in Annex B.

4.5 The material shall also comply with the requirements given in Table 1 when tested in accordance with the methods prescribed in col 11.

5 PACKING AND MARKING

5.1 Packing

The material shall be packed in Laminated Jute bags conforming to IS 7406 (Part 1) or high density polyethylene (HDPE)/Polypropylene (PP) woven sacks conforming to IS 9755, in quantities as stipulated in *Essential Commodities Act*, 1955 and the *Legal Metrology (Packaged Commodities) Rules*, 2011 and in accordance with *Fertilizer (Control) Order*, 1985.

5.2 Marking

The containers shall be securely closed and marked with the following:

- a) Name of manufacturer/Pool handling agency/Importer (where a manufacturer is also pool handling agency, word 'P' and as the case may be, if an importer the word 'I' shall be written against the name of such manufacturer, if the bag contains imported fertilizer);
- b) Trade-mark and/or Brand name, if any;
- c) Name of the fertilizer (in case of imported fertilizer, the word 'Imported' shall be superscribed);

- d) Percent nutrient as total nitrogen, water soluble P₂O₅, water soluble K₂O and sulphur to be denoted by the letters: 'N', 'P(WS)', 'K' and 'S', respectively;
- e) Gross and net quantity in kilogram;
- f) Batch number;
- g) Maximum retail price inclusive of all taxes;
- h) Month and year of manufacture/import (in case of imported fertilizer); and
- j) Any other information required under the *Fertilizer (Control) Order*, 1985 and the *Legal Metrology (Packaged Commodities) Rules*, 2011.

5.2.1 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark

6 HANDLING AND STORAGE

6.1 The handling and storage of the fertilizer shall be as prescribed in IS 5985.

7 SAMPLING

7.1 The method for drawing representative samples of the material shall be in accordance with IS 6092 (Part 1).

7.2 Number of Tests

Tests for all the requirements given in 4 shall be conducted on the composite test sample.

7.3 Criteria for Conformity

For declaring the conformity of the lot to requirements of this specification, the test results on the composite test sample shall satisfy all the requirement specified in 4.

Table1 Requirements for Nitrophosphate Based Granulated Fertilizers

(Clause 4.5)

Sl No.	Characteristic	Requirement for Grade								Method of Test, Ref to Clause
		Nitrophosphate			Nitrophosphate with Potash					
		20-20-0	23-23-0	24-24-0	14-14-21	15-15-15	15-15-15	15-9-20	21-6-13	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	Moisture, percent by weight, <i>Max</i> ¹⁾	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	4 of IS 6092 (Part 6)
ii)	Total nitrogen, percent by weight, <i>Min</i> ²⁾	20.0	23.0	24.0	14.0	15.0	15.0	15.0	21.0	8 of IS 6092 (Part 2)
iii)	Ammoniacal nitrogen (as N), percent by weight, <i>Min</i>	10.0	13.0	13.5	8.0	7.5	8.5	8.5	10.5	11 of IS 6092 (Part 2)
iv)	Nitratenitrogen, percent by weight, <i>Min</i>	10.0	10.0	10.5	6.0	7.5	6.5	6.7	10.5	15 of IS 6092 (Part 2)
v)	Neutral ammonium citrate soluble phosphates (as P ₂ O ₅), percent by weight, <i>Min</i>	20.0	23.0	24.0	14.0	15.0	15.0	9.0	6.0	9 of IS 6092 (Part 3)
vi)	Water soluble phosphates (as P ₂ O ₅), percent by weight, <i>Min</i> ²⁾	12.0	20.5	20.5	9.0	4.0	9.8	6.0	4.0	7 of IS 6092 (Part 3)
vii)	Calcium nitrate, percent by weight, <i>Max</i>	1.0	–	–	–	1.0	–	–	–	5.4 of IS 6092 (Part 6)
viii)	Water soluble potash (as K ₂ O), percent by weight, <i>Min</i> ²⁾	–	–	–	21.0	15.0	15.0	20.0	13.0	5 of IS 6092 (Part 4)
ix)	Sulphur, percent by weight, <i>Min</i> ²⁾	–	–	–	–	–	3.5	3.5	–	5.3 of IS 6092 (Part 5)
x)	Total chlorides, percent by weight, <i>Max</i>	–	–	–	–	–	3.5	–	–	6.8 of IS 6092 (Part 5)
xi)	Magnesium, percent by weight, <i>Min</i>	–	–	–	–	–	–	0.5	–	5.2 of IS 6092 (Part 5)

¹⁾ A tolerance of 0.3 units of moisture content shall be permissible.

²⁾ Tolerance varies with nutrient level in fertilizer subject to maximum of 2 percent for all combined nutrients:

Nutrient level (%)	Tolerance level (unit)
15 or less	0.5
16 to 20	0.6
21 or more	0.7

ANNEX A

(Clause 4.3)

**METHODS OF TEST FOR DETERMINATION OF RESISTANCE
TO BREAKDOWN OF GRANULES****A-1 GENERAL**

Two methods are described here. The methods are used to determine comparative hardness of granules and applicable to granulated or pelleted forms of solid fertilizers. Any of the two methods may be used.

A-1.1 Method A**A-1.1.1 Apparatus**

A-1.1.2 Hardness Tester—as shown in Fig. 1.

A-1.1.3 Procedure

Collect a portion of the sample lying in the size range 2.80 and 3.35 mm. From the portion obtained pick out at random 25 granules. Test each granule successively. Place each granule under the ratchet and slowly screw it down until the particle crushes. Note the crush point on the scale indicator and record the load required to crush it.

A-1.1.4 Calculation

Calculate in kg the mean of the 25 observations and report the results.

A-1.2 Method B**A-1.2.1 Apparatus**

The apparatus, made of mild steel, is shown in Fig. 2. It consists of two parts, namely a frame and a plunger.

The frame is made of three circular plates and three rods fitted with nut and bolt. These rods are fitted vertically on the base plate and the other two plates are fixed tightly in position. Circular holes are made at the centre in these two plates as shown in Fig. 2 through which the plunger rod can pass smoothly. The plunger weighing 150 g consists of a circular plate at the top (for keeping additional weights) and a narrow stem of 'diameter 4 mm' at the base which can rest either on the base plate or on the fertilizer granule.

A-1.2.2 Procedure

Collect a portion of the sample lying in the size range 2.80 mm to 3.35 mm. From the portion obtained pick out at random 25 granules.

Test each granule successively. Place each granule at the centre of the base plate and keep the stem of the plunger just on its top. Put additional weights on the top of the plunger incrementally and note the total mass of the plunger itself plus the additional mass at which the granule crushes.

A-1.2.3 Calculation

Calculate in kg the mean of the 25 observations and report the results.

ANNEX B

(Clause 4.4)

METHOD OF TEST FOR LUMP FORMATION**B-2.1 PROCEDURE**

Store one 50 kg packing of the material under a mass equivalent to twelve 50 kg sample bags of the material for 7 days. Then drop the sample bag from a height of 1.5 meters on to hard concrete floor. Empty out the contents of the bag and determine the quantity of

the material larger than 12 mm size with the help of a standard sieve.

B-1.1 The material shall be taken to have passed the test if not more than 5 percent of the material is larger than 12 mm in size.

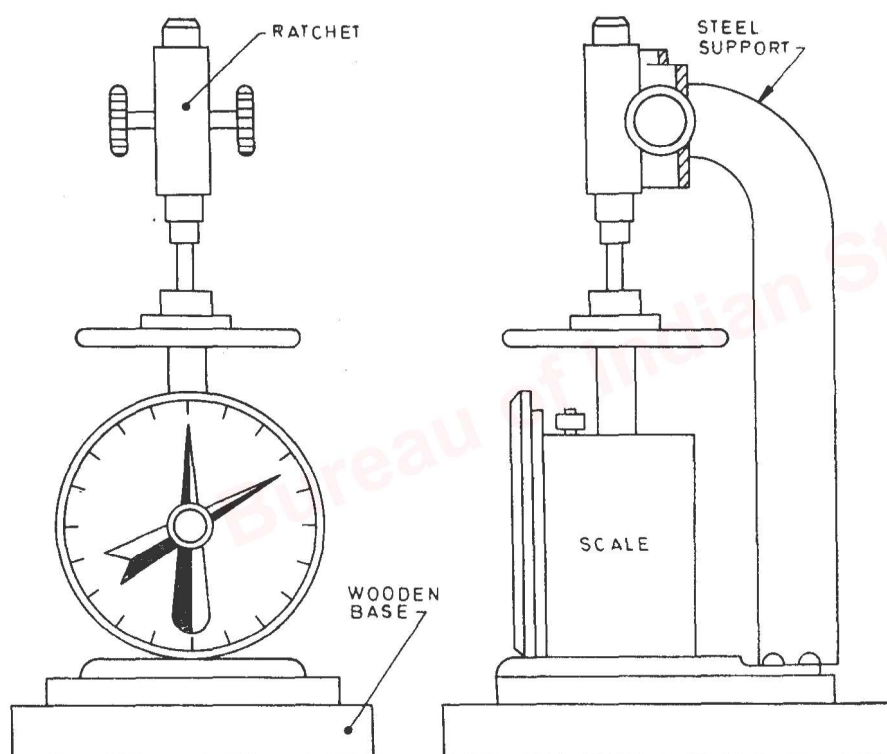
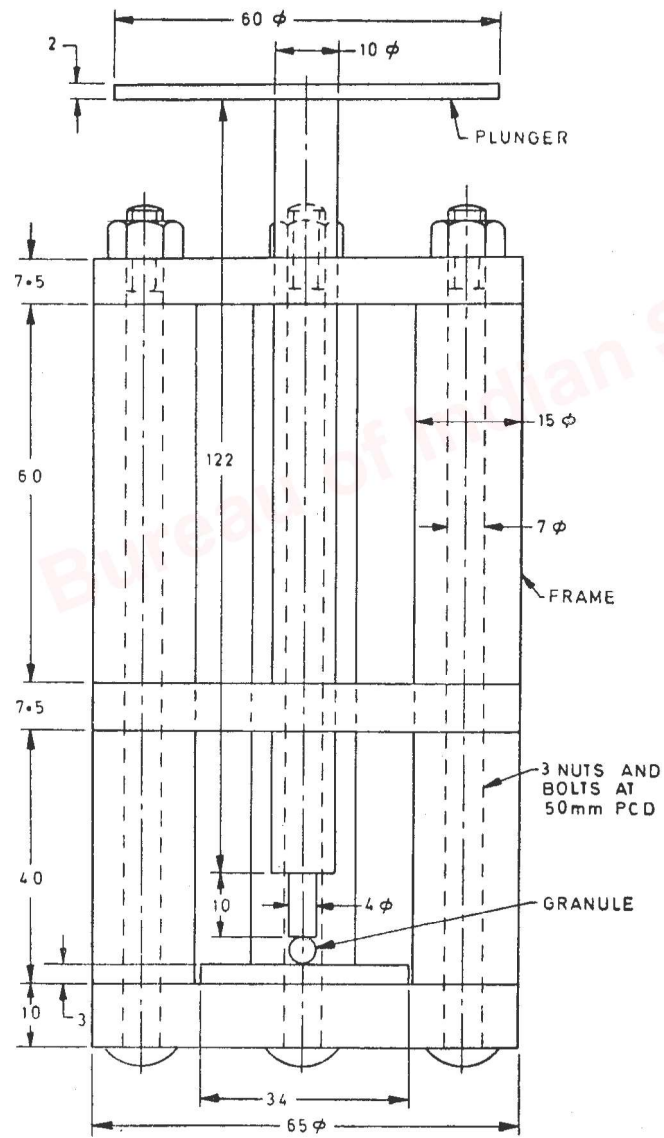


FIG. 1 HARDNESS TESTER, METHOD A



All dimensions in millimetres.

FIG. 2 HARDNESS TESTER, METHOD B

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

	Telephones
Central : 601/A, Konnectus Tower-1, 6 th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	{ 2323 7617
Eastern : 8 th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	{ 2367 0012 2320 9474
Northern : Plot No. 4-A, Sector 27-B, Madhya Marg Chandigarh 160019	{ 265 9930
Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	{ 2254 1442 2254 1216
Western : Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	{ 2821 8093

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